and if adhered to, nothing need be apprehended. I could instance several suspension bridges that have stood many years in this country, without injury, whose limits of elasticity do not exceed 30 lbs. per square foot, whilst at any time they are liable to be loaded to 70 lbs., which they may bear once or twice, but it would permanently cripple and weaken the structure, and repeated loading eventually destroy it. I must also differ from you in supposing that a suspension is more liable suddenly to give way than a compression bridge; in proof of the contrary I will instance the fall of the bridge across the Mill Fleam, at Derby, those at Ashton-under-Lyne, and several others that have occurred lately by which lives have been lost. The fact is, the erroneous principles upon which both suspension and compression bridges are constructed of necessity compel their failure directly any part, however trivial, yields. This for several years I have been trying to impress upon the public, and have at last succeeded. And though there are still many persons who object to my plan, yet I am happy to know that eventually they must acknowledge it to be correct." For upon what natural principle can it be argued that the failure of a single part, however trivial in itself, should destroy the whole.

It is impossible but that some parts must be weaker than others, and the weakest part will always be proportionably most strained, and should at any time the pressure on these parts exceed the limits of elasticity, it yields, and the bridge fails also. What argument then can be brought forward to support a principle that reduces the strength of the whole to that of the weakest part. And I tell the mathematicians (for as I know something of that science, without presumption may I tell them so) that the principle is wrong—and not all the reasoning in the world can make it right—and that a bridge should no more be destroyed by the failure of a single part than a limb of a tree should fall down by lopping off a part from it; the fractured end in both instances would fail, but the rest should remain as firm as ever.

I am, Sir, &c.,

Bath, June 16th. JAMES DREDGE.

N.B. The Montrose Bridge did not fall at the opening, but a long time afterwards at the time of a boat-race. J. D.

*** We have inserted Mr. Dredge's letter, notwithstanding that a threat of an action for libel if we did *not* do so accompanied it, and had nearly led us to adopt a contrary course.

SIZE OF MAIN DRAINS UNDER BUILDINGS ACT.

SIR,—I am at a loss to know what size to make the main drain for carrying off soil. In the Act it mentions, that it must be in transverse section at least equal to a circular area of 9 inches diameter. Now, as I am not sufficiently competent to understand such ambiguity, will you, in your next number, make the point clear, for I find many other persons puzzled equally as much as your humble servant, A BRICKLAYER.

*** We wish no part of the Act was more ambiguous than the clause quoted. A 9-inch barrel drain (or larger) may be used, or a drain of any other shape provided it afford water-way (area) equal to a 9-inch barrel drain. The area of the latter is 5 inches and 3 parts, so that, for the sake of example, a rectangular drain not less than 9 inches by 7 inches may be used, or one 12 inches by 5¼ inches, since the area of either of these is equal to that required.

ARCHÆOLOGICAL CONGRESS AT LILLE.—Members of the French Archæological Congress held at Lille, visited Tournay on the 8th inst., and examined all the antiquities of that very interesting town. They were received with extraordinary demonstrations of respect even to the ringing of the great bells of the cathedral. Relative to this, the bishop of Tournay who received the congress in the episcopal palace said, "The bells you hear gentlemen, sound but for God and our princes: you are the princes of science, and I have thought it right to make them utter your welcome." Our countryman, Dr. Bromet, is the only representative of England mentioned, and is described as the *president* of the Archæological Society of London. Next week we shall give a few particulars of Tournay and its cathedral.

RAILWAY STRUGGLES.

SIR,—In No. 122 of your valuable periodical, you allude to the expensive contest now being carried on between the "broad and narrow gauges" and the interest it excites in the Parliamentary Committees and the railway world. Being a looker-on and unconnected with railways, and without entering further into the question of the gauges than to state, that it appears the difference in cost of earthwork between the broad and narrow gauge is 6½ per cent., 7 per cent. land, with a larger expenditure in bridges, carriages, &c., and an additional expense in the upper works to carry the heavier locomotives, &c., as well as extra lines of rails to suit the traffic of the narrow gauge, it appears to me that the difference of the cost of construction would amount to at least from 20 to 25 per cent. in favour of the narrow gauge. With reference to speed, the express trains on the London and Birmingham Railway exceed one mile per minute, and it has been stated with regard to the power of draught, that ninety-five waggons in one train, each containing seven tons, have been conveyed on the narrow gauge, and I have yet to learn the superiority of the broad gauge, or that more has been accomplished by it. It appears to me, Mr. Editor, that the Government and the legislature are exceedingly culpable in looking on with apathy and indifference, while thousands are squandered in these fruitless contests, and although a department of the Board of Trade was obviously appointed to investigate the merits of the various lines of railway before being submitted to Parliament and to report thereon, opposition seems to be carried on to a greater extent and with greater virulence than before. The appointment of the Railway Department of the Board of Trade has not, I conceive, effected the purpose contemplated, for the old channel is still open to railway promotion, with all its expensive paraphernalia; and bills pass through or are rejected by the parliamentary committees, notwithstanding the reports of the Railway Department of the Board of Trade being in favour of or against them. It evidently has been no check either upon reckless speculation or inveterate opposition. The reports of the Railway Department of the Board of Trade, although very able documents, were in general unfavourable to those lines that would compete with existing lines of railway, so that in many instances important places would be connected with rather circuitous routes; certainly the great speed attained on railways has in a measure almost annihilated space, but still I very much question the policy recommended in preferring such routes, at an additional expense to the traveller, when direct ones can be obtained, merely to uphold monopoly, nor do I believe from the spirit of the age the public would long submit to any such arrangements. Railway companies with little delicacy deprived turnpike roads and canals of the whole, or at least, a great portion of their traffic, and now if the public interest require it, they cannot complain of a little fair competition in their own way. The Romans in laying out their roads adopted a straight line between termini without reference to intermediate obstacles, and our own engineers in setting out canals and turnpike-roads, secured the most direct route the nature of the country would admit of, and even important alterations and improvements have been made to shorten the distance between places of considerable traffic. So I suppose the improvement of railways will be left to the next generation, who, enlightened by our errors, will perfect the system we so erroneously and injudiciously began. Again, the most approved system for working railways seems to be very imperfectly understood, some eminent engineers advocating the locomotive, others the atmospheric system (amongst the former are the Stephensons, Macneill, and others; the latter Brunel, Cubitt, and others), and each party asserting the superiority of its own hobby; but in the present state of the question the public at large are incompetent to form an opinion. As the present time would be a good opportunity of investigating the merits of the rival systems of propulsion, as well as that of the gauge, the construction of railways, their upper works, &c., I would suggest the propriety of a commission being appointed, with adequate powers to collect evidence or conduct experiments, composed of eminent men possessed of great scientific attainments and extensive experience, who would be qualified by an intimate knowledge of the subjects at issue, to grapple with them in all their different and difficult bearings.

I am aware that implicit dependance is not to be placed upon the opinions of our engineers, as they are not infallible (besides many of them, like those in other professions, do that they are required to do and are paid for doing); and, as a proof of what I state, at the completion of the Liverpool and Manchester Railway, fifteen miles per hour was considered by engineers to be the maximum speed for a locomotive engine and train, the gradients worked successfully now were considered to be impracticable then, as were other points that are now established, which would extend this communication to too great a length for the columns of your journal.

As many millions of money are at stake in these railway projects, and as the best principles of construction and propulsion seem to be but *a mere matter of opinion*, I conceive, Mr. Editor, the subject is of the utmost importance to the community at large, and I respectfully submit, worthy the consideration of the legislature and the Government of a great commercial country like ours, who should emulate the rulers of the kingdoms of ancient Greece and Rome in the zenith of their glory, and turn their attention on a broad and comprehensive scale, more particularly to the improvement of our means of communication, and the better development of the internal resources of our common country.

I am, Sir, &c., B. B.

Brecon, South Wales, June 16, 1845.

NEW CHURCH, NEAR RAMSGATE.

TRINITY Church, Mount Albion, St. Lawrence, near Ramsgate, was consecrated on Wednesday, June 11, by the Archbishop of Canterbury, who arrived at eleven o'clock, and was received by about 20 clergy, the committee, trustees, and churchwardens. After the service a capital cold collation was laid at the vicar's, where 40 clergy and others met the Archbishop, who looked well, and commended the church and its promoters. Flags were flying at St. Lawrence, and triumphal arches erected. The church is in the perpendicular style (the style of the fifteenth century), and will accommodate 770 persons. It is 75 feet 6 inches long, and 52 feet 6 inches broad internally, and is divided into naves and aisles by octagon pillars, carrying a clerestroy. The ceilings are all boarded and open. The pewing and free-seats, uniform, low, not painted, but varnished. There is a four-light painted-glass window to the chancel, with figures of St. Mathew, Mark, Luke, and John, paid for by subscription; and a two-light window presented by Mr. W. E. Smith, the builder of the church, at the east end of the south aisle, both made by Warrington, of London.

The building is faced with flints, with free-stone quoins. The cost of the whole, including all expenses, was under 3,000*l.*, being less than the architect's estimate; of this about 1,600*l.* only has been raised, for the rest the promoters are responsible. The ground was presented by Mdlle. D'Este. The architects are Messrs. Stevens and Alexander, of London.

GLASS ROOFING.—We learn from the newspapers that within the last few days a rather novel importation has been made in the port of London. This is a small quantity of glass tiles, similar in point of form to the common clay tile for roofing buildings, the advantage held out being their lightness, and being pervious to the rays of the sun. The latter quality is presumed to render them suitable for the roofs of greenhouses, as they will not interrupt the heat and light, whilst they are sufficiently strong to resist the effects of hail-storms, which will much reduce the cost of insurance on greenhouses, &c. The importation is made from Antwerp, and they are chargeable with a duty of 14*s.* per cwt. under the present tariff. They have the appearance of the common green glass, and if the experiment is found to succeed, it demands the immediate attention of our home manufacturers. We shall be glad to learn where these glass tiles can be obtained.

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